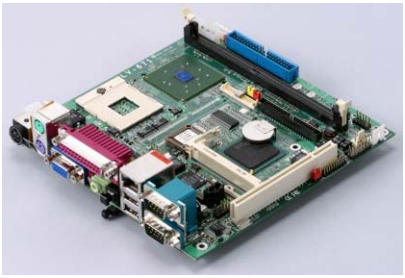
# LV-671

## Mini-ITX Motherboard

### User's Manual

Edition: 1.42

2007/11/19



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# DECLARATION OF CONFORMITY

We herewith confirm the following designated product

**Single Board Computer**
**Model No.: LV-671**

( Product Identification )

has been tested and found to comply with the requirements set up in the council directive on the approximation of the law of member states relating to the EMC Directive 89/336/EEC, amended by 92/31/EEC & 93/68/EEC. For the evaluation regarding to the electromagnetic compatibility, the following standards were applied:

* **EN 55022:1998+A1:2000+A2:2003, Class B**
* **EN 61000-3-2 edition 2:2000**
* **EN 61000-3-3:1995+A1:2001**
* **EN 55024:1998+A1:2001+A2:2003**
  **IEC 61000-4-2:1995+A1:1998+A2:2001**
  **IEC 61000-4-3:2002+A1:2002**
  **IEC 61000-4-4:1995+A1:2001+A2:2001**
  **IEC 61000-4-5:1995+A1:2001**
  **IEC 61000-4-6:1996+A1:2001**
  **IEC 61000-4-8:1993+A1:2001**
  **IEC 61000-4-11:1994+A1:2001**

( Identification of regulations / standards )

This declaration is the responsibility of the manufacturer / importer

**TAIWAN COMMATE COMPUTER INC.**
**8F, NO. 94, SEC. 1, SHIN TAI WU RD.,**
**HSI CHIH, TAIPEI HSIEN,**
**TAIWAN, R.O.C.**

( Name / Address )

**MANUFACTURER / IMPORTER**

(Name)

(Date )

**TEST LABORATORY**

This declaration is based on the test report (Ref. No. A04061507) issued by SRT Lab., Inc. on July 05, 2004. The Declaration of Conformity has not yet included the test standard, EN 60950 which is applied to the product and required by Low Voltage Directive 73/23/EEC.

(Johnson Ho, Director)

July 05, 2004
(Date)

**SPECTRUM RESEARCH & TESTING LABORATORY, INC.**

NO. 101-10, LING 8, SHAN-TONG LI, CHUNG-LI CITY, TAOYUAN, TAIWAN, R.O.C. TEL: (03)498-7684 FAX: (03)498-6528

# DECLARATION OF CONFORMITY

We herewith confirm the following designated product

**Single Board Computer**
**Model No.: LV-671**

( Product Identification )

has been tested and found to comply with the requirements of 47 CFR PART 15 regulation & ANSI C63.4 for the evaluation of Class B of electromagnetic compatibility.

This device complies with Part 15 of the FCC rules, operation is subject to the following two conditions.

(1) This device may not cause harmful interference and,
(2) This device must accept any interference received, including interference that may cause undesired operation .

( Identification of regulations / standards )

This declaration is the responsibility of the manufacturer / importer

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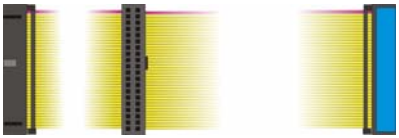
# Packing List

Please check the package before you use this product

## Hardware:

LV-671 Mini-ITX motherboard x 1

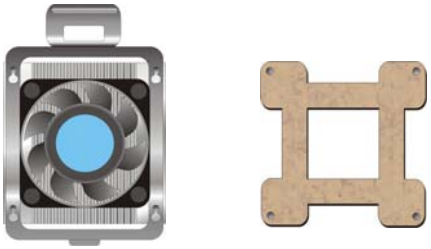
## Cable Kit:



**40-pin ATA100 IDE Cable x 1**

**26-pin Slim Type Floppy Cable x 1**

**4-pin to 4-pin Power Cable x 1**



**CPU Cooler x 1**

## Other Accessories

Driver CD (Including User's Manual ) x 1

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# Chapter 1 <Introduction>

## 1.1 <Product Overview>

**LV-671** is an all-in-one industrial compact Pentium-M level motherboard based on Mini-ITX form factor at 170 x 170 mm of dimension. Based on Intel **855GME** and **ICH4** chipset, **LV-671** offers the compact, embedded, value and high performance solution with Intel Pentium-M CPU, 400MHz/533MHz of FSB, 1GBytes DDR200/266/333 SDRAM with ECC, Intel 855GME GMCH built-in Intel Extreme Graphics 2, Intel PRO/1000+ LAN, Hi-Speed USB 2.0, 5.1 channel and S/P DIF 3D audio, **18/24-bit** dual channel LVDS, GPIO and embedded flash disk interfaces.

**Low Power Consumption Solution**

Based on Intel 855GME chipset and Intel Pentium M/Celeron M processor, the board requires lower power consumption than Pentium 4 –M processors. The Intel Pentium M integrates 512KB/1MB/2MB of L2 cache, so it provides better performance than before.

**Dual Display Architecture**

Intel 855GME supports two DAC for display interface; users can apply two display devices for dual display clone or extended desktop display. With this feature, system integrator can use this board for Kiosk, ATM, or industrial control machines.

**5.1 Channel AC97 Audio**

**LV-671** integrates a REALTEK 5.1 channel AC97 codec; users can enjoy the live surround sound through 5.1 channel speakers. **LV-671** also has an S/PDIF jack for digital sound outputting.

**Hi-Speed USB 2.0 Interface**

Intel ICH4 built-in Hi-Speed USB 2.0 controller let **LV-671** offer up to 480Mbps of transferring rate.

**Card Bus and Embedded Flash Disk**

The **LV-671** support PCMCIA Type I/II enable you can simply use the wireless LAN module or other extended devices, the Compact Flash interface and IDE1 with DOM support can let you port any embedded system onboard.

**Mini-PCI and Mini-AGP interface**

With Mini-PCI interface, users can add a wireless LAN module or video capture module for powerful communication solutions. With Mini-AGP interface, users can apply the AGP graphic card or additional video output module such as HDTV or DVI.

## 1.2 <Product Specification>

| General Specification | |
|---|---|
| Form Factor | Mini-ITX motherboard at 170 x 170 mm (L x W) |
| CPU | Package: 478 pin PGA/ 479 pin BGA<br>L2 Cache: 512KB/1MB/2MB<br>FSB: 400MHz/533MHz<br>( The Intel® Celeron® M Processor 4xx series have been designed to work with the Mobile Intel® 945 Express Chipset Family only .) |
| Memory | 1GBytes DDR200/266/333 SDRAM on one 184-pin DIMM socket<br>ECC memory is supported |
| Chipset | Intel 82855GME GMCH and 82801DB ICH4 |
| BIOS | Phoenix-Award v6.00PG 4Mb PnP flash BIOS |
| Green Function | Power saving mode includes doze, standby and suspend modes.<br>ACPI version 1.0 and APM version 1.2 compliant |
| Watchdog Timer | System reset programmable watchdog timer with 1 ~ 255 sec./min. of timeout value |
| Real Time Clock | Intel ICH4 built-in RTC with lithium battery |
| Enhanced IDE | PCI enhanced IDE interface supports dual channels and up to 4 ATAPI devices at UltraATA/100<br>One 40-pin and one 44-pin IDE port<br>DiskOnModule (DOM) embedded flash disk up to 6GBytes |

| Multi-I/O Port | |
|---|---|
| Chipset | Intel 82801DB ICH4 (USB) and Winbond W83627HF-AW LPC Super I/O controller |
| Serial Port | Two external RS-232 serial port with 16C550 compatible UART and 16 bytes FIFO |
| USB Port | Six Hi-Speed USB 2.0 ports with 480 Mbps of transfer rate<br>Two external and four internal USB ports |
| Parallel Port | One external bi-direction parallel port with SPP/ECP/EPP mode |
| Floppy Port | One slim-type FDD port supports up to two FDD |
| IrDA Port | One IrDA compliant Infrared interface supports SIR |
| K/B & Mouse | External PS/2 keyboard and mouse ports on rear I/O panel |
| GPIO | One 20-pin Digital I/O connector with 15-bit programmable I/O interface |
| **Card Bus** | |
| PCMCIA | One PCMCIA Type I/II slot |
| **VGA Display Interface** | |
| Chipset | Intel 855GME GMCH built-in Intel Extreme Graphics 2<br>With 266 MHz VGA core and 256-bit 3D engine |

| | |
|---|---|
| Frame Buffer | Intel DVMT (Dynamic Video Memory Technology) 2.0 up to 64Mbytes shared with system* |
| Display Type | CRT and LCD monitors for analog display<br>24-bit single/dual channel LCD panel for digital display |
| Connector | External DB15 female connector on rear I/O panel<br>Internal 40-pin LVDS connector |

**Under Windows 98/ME/2000/XP/Server2003 or Linux kernel 2.4 later*

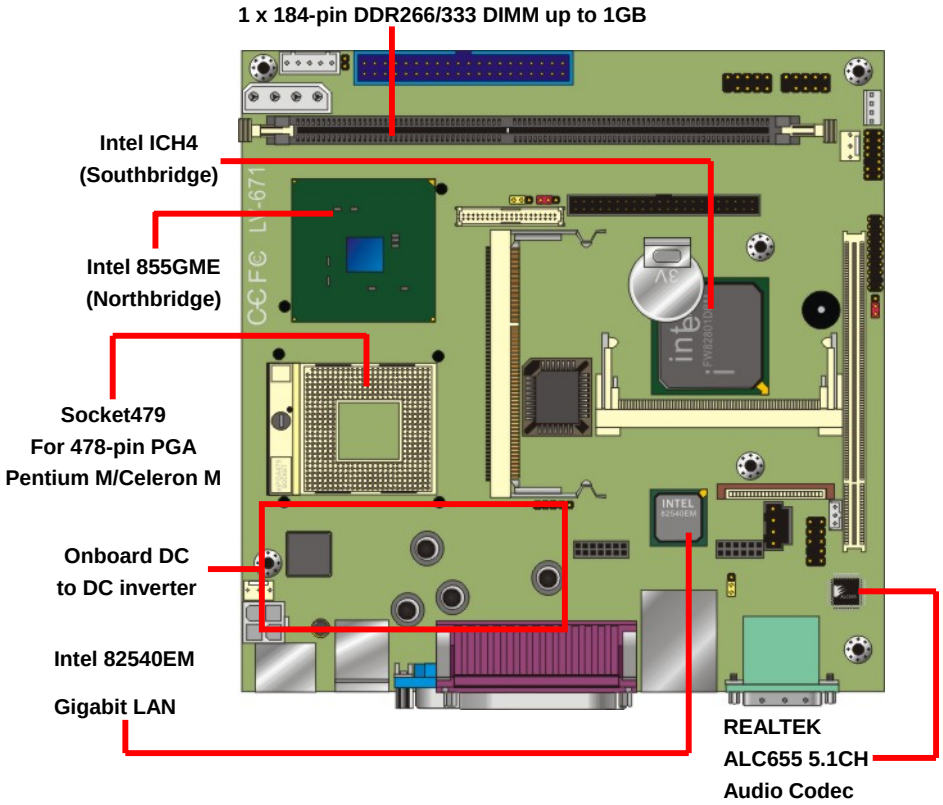
| **Ethernet Interface** | |
|---|---|
| Chipset | Intel PRO/1000+ LAN interface with Intel 82540EM |
| Type | 10Base-T / 100Base-TX/1000Base-T,<br>auto-switching Fast Ethernet<br>Full duplex, IEEE802.3U compliant |
| Connector | External RJ45 connector with LED on rear I/O panel |
| **Audio Interface** | |
| Chipset | Intel ICH4 with REALTEK ALC655 AC97 3D audio codec |
| Interface | 5.1 channel 3D audio with front (R/L), rear (R/L), center and bass<br>Optical Fiber digital audio encoding signal output |
| Connector | Optional external three phone jack for 5.1 channel audio onboard<br>External Amplified Speaker output jack on rear panel<br>External SPDIF connector on rear panel<br>Internal 10-pin header for line-in/-out, MIC-out, 4-pin header for CD-in |
| **Solid State Disk Interface** | |
| Flash Type | Compact Flash Type-I for Compact Flash Card or IBM Micro Drive |
| Capacity | Up to 1GB flash memory |
| **Expansion Interface** | |
| Slim PCI Slot | One slim type PCI slot supports up to 2 bus master PCI<br>32-bit, 33MHz |
| Mini-PCI | One Mini-PCI type B socket with 32-bit, 33MHz for **LV-671MP series** |
| Mini-AGP | One Mini-AGP socket with 4x AGP bus for **LV-671MA series** |

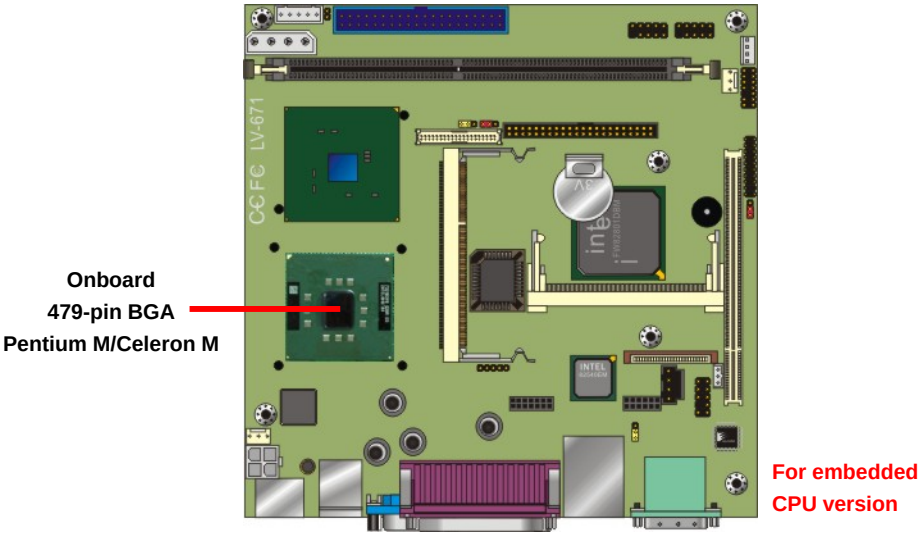
| Power and Environment | |
|---|---|
| Power Requirement | One external 19V/12V (auto switching) DC Adapter connector on rear panel<br>4-pin onboard 12V P4 4-pin power connector<br>(Two power resources selectable for each) |
| Input Voltage Range | 11V ~ 13V for 12V power supply<br>16V ~ 20V for 19V power supply |
| Input Current | 12V/60W (with one 5.25" CDROM and 3.5" HDD)<br>19V/60W (with one 5.25" CDROM and 3.5" HDD) |
| Dimension | 170 (L) x 170 (H) mm, Mini-ITX form factor |
| Temperature | Operating within 0 ~ 60°C (32 ~ 140°F)<br>Storage within -20 ~ 85°C (-4 ~ 185°F) |

| Ordering Code | |
|---|---|
| **LV-671-MA** | Mini-ITX Socket 479 Pentium-M processor Motherboard with Intel Extreme VGA, LAN, 5.1-CH/SPDIF Audio, Hi-Speed USB 2.0, **mini-AGP** socket and LVDS interface. |
| **LV-671-MP** | Mini-ITX Socket 479 Pentium-M processor Motherboard with Intel Extreme VGA, LAN, 5.1-CH/SPDIF Audio, Hi-Speed USB 2.0, **mini-PCI** socket and LVDS interface. |
| **LV-671-MAPM11** | Same as **LV-671-MA** and with onboard Intel Pentium M 1.1GHz processor for ULV/LV version. |
| **LV-671-MPPM11** | Same as **LV-671-MP** and with onboard Intel Pentium M 1.1GHz processor for ULV/LV version. |
| **LV-671-MACM6** | Same as **LV-671-MA** and with onboard Intel Celeron M 600MHz processor for ULV/LV version. |
| **LV-671-MPCM6** | Same as **LV-671-MP** and with onboard Intel Celeron M 600MHz processor for ULV/LV version. |

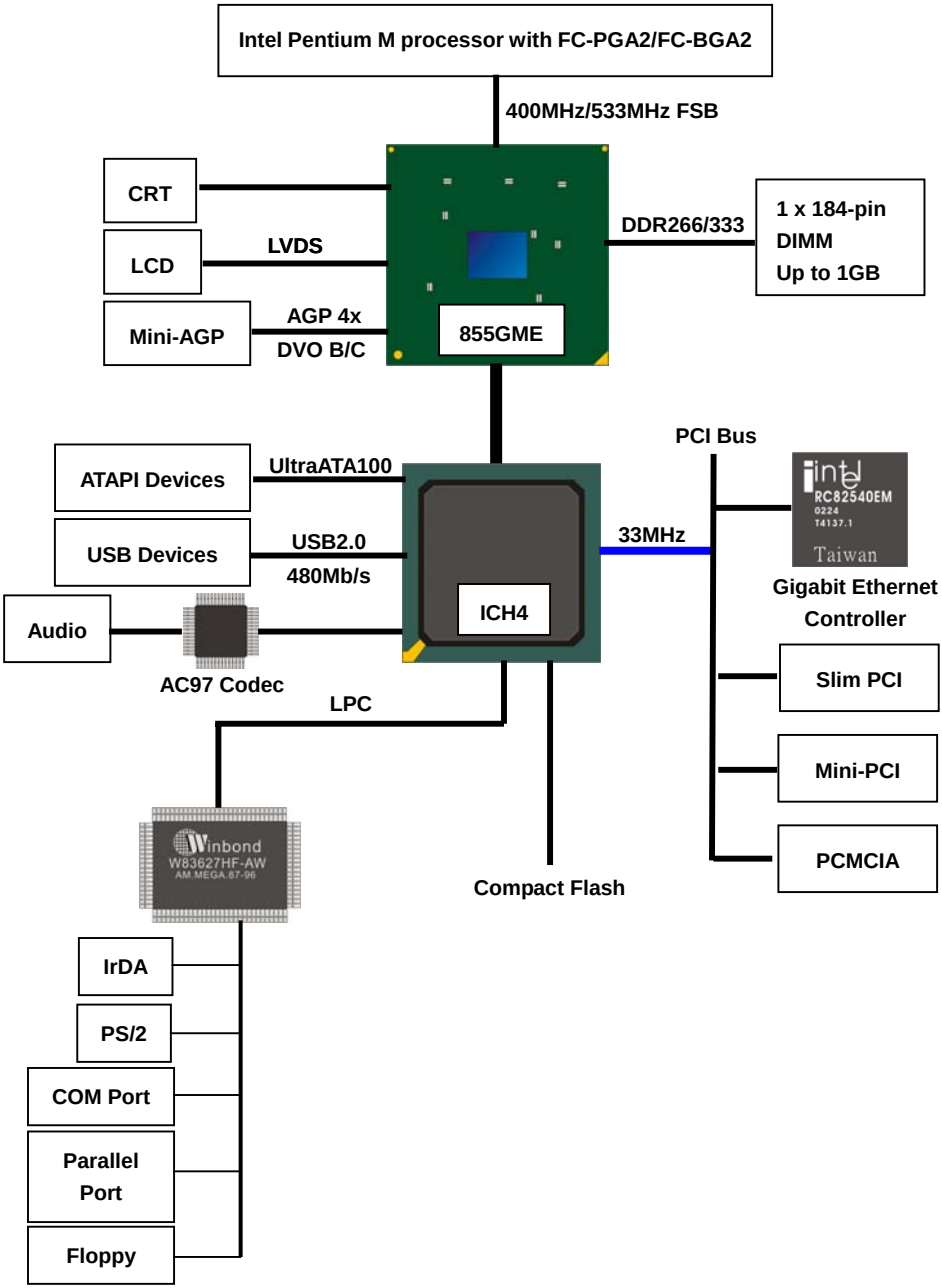
For further product information please visit the website at http://www.commell.com.tw

## 1.3 <Component Placement>



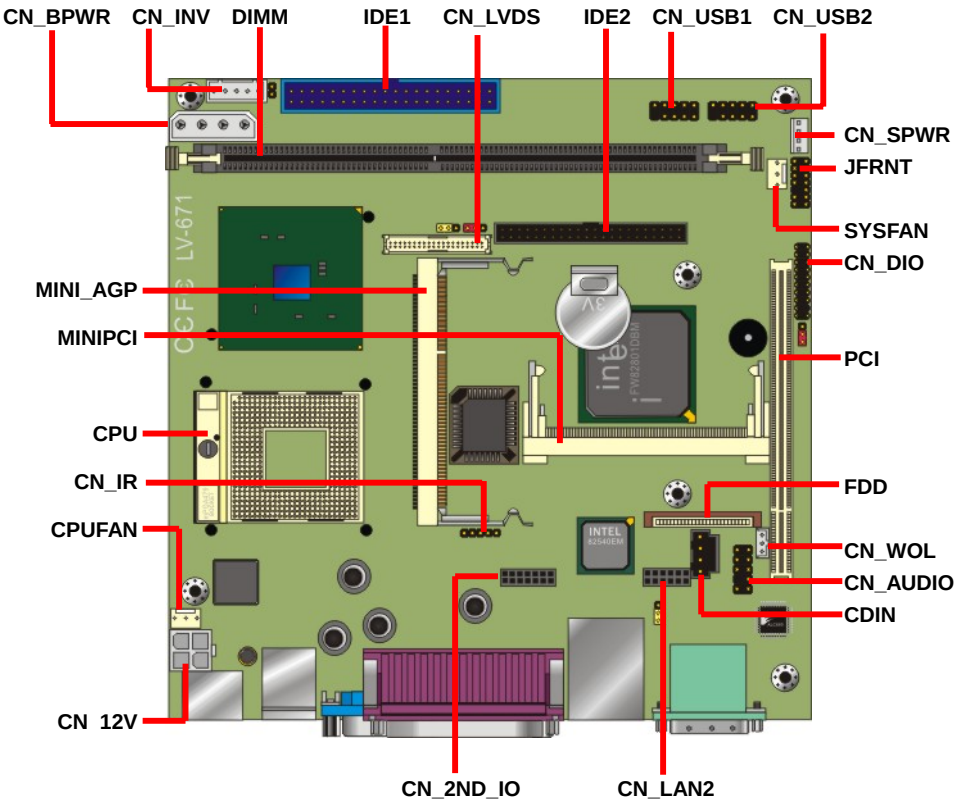
## 1.4 <Block Diagram>

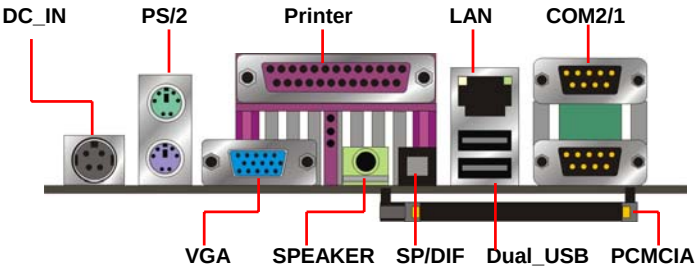


# Chapter 2 <Hardware Setup>

This chapter contains the information for installation of hardware. The install procedure includes jumper settings, CPU and memory installation, fan, I/O and panel connections.

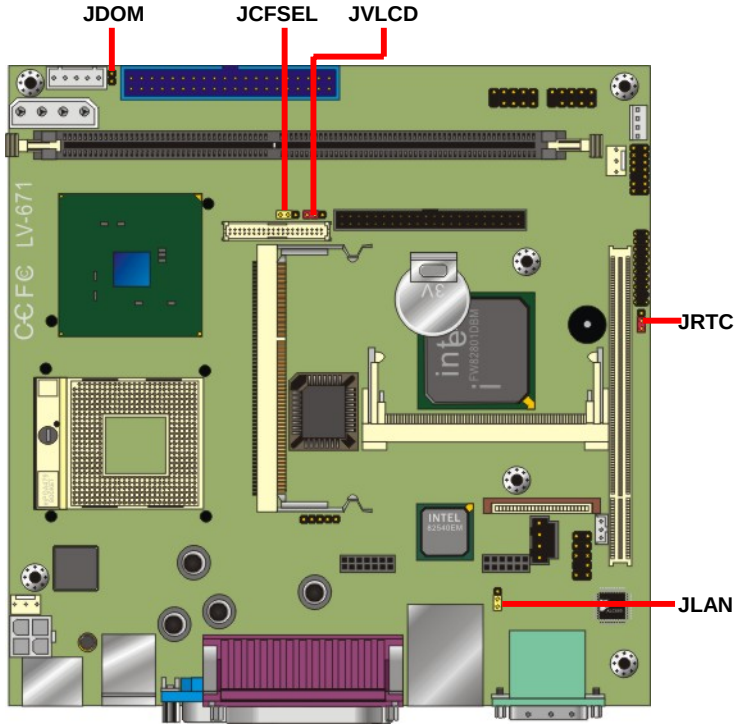
## 2.1 <Connector Location>



## 2.2 <Jumper Reference>

| Jumper | Function |
|---|---|
| JRTC | COMS Operate / Clear Setting |
| JLAN | LAN1 Enable/Disable |
| JVLCD | LCD Panel Voltage Setting |
| JCFSEL | Compact Flash Address Setting |
| JDOM | IDE1 5V Voltage Enable/Disable |



# 2.3 <Connector Reference>

## 2.3.1 <Internal Connector>

| Connector | Function | Remark |
|---|---|---|
| CPU | MicroPGA479 CPU Socket | Standard |
| DIMM | 184-pin DIMM Socket | Standard |
| IDE1 | 40-pin Primary IDE Port | Standard |
| IDE2 | 44-pin Secondary IDE Port | Standard |
| FDD | 26-pin slim type FDD Port | Standard |
| CN_USB1 | 10-pin 3rd / 4th Hi-Speed USB 2.0 Port | Standard |
| CN_USB2 | 10-pin 5th / 6th Hi-Speed USB 2.0 Port | Standard |
| CN_IR | 5-pin SIR IrDA Port | Standard |
| CN_12V | 4-pin AT Power Connector | Standard |
| CN_BPWR | 4-pin 5V&12V output connector | Standard |
| CN_SPWR | 4-pin 5V&12V output connector | Standard |
| JFRNT | 14-pin Switch and Indicator Connector | Standard |
| CPUFAN | 3-pin +12V CPU Fan Connector | Standard |
| SYSFAN | 3-pin +12V System Fan Connector | Standard |
| CN_AUDIO | 10-pin Audio Port | Standard |
| CDIN | 4-pin CD-in Interface | Standard |
| CN_WOL | 3-pin Wake-On-LAN Interface | Standard |
| CN_LVDS | 40-pin LVDS connector | Standard |
| CN_INV | 5-pin LCD Inverter Power Connector | Standard |
| CN_DIO | 20-pin programmable I/O connector | Standard |
| CN_LAN2 | Additional Ethernet Controller Interface | Standard |
| CN_2ND_IO | Additional I/O module interface | Standard |
| CF | Compact Flash Card Interface | Standard |
| PCMCIA | PCMCIA Card bus interface | Standard |

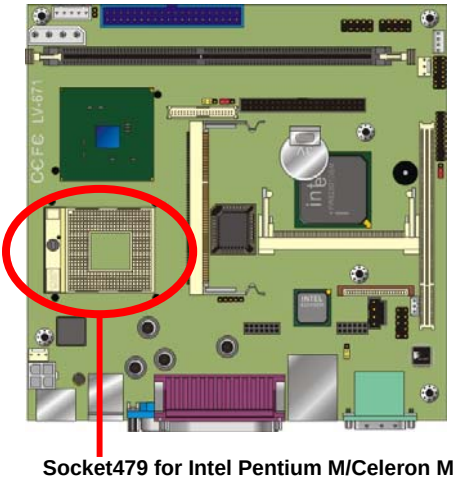
## 2.3.2 <External I/O connector>

| Connector | Function | Remark |
|---|---|---|
| DC_IN | 4-pin 12V/19V auto-switching input | Standard |
| PS2 | PS/2 type keyboard and mouse port | Standard |
| Printer | DB26 parallel port | Standard |
| VGA | DB15 VGA port | Standard |
| SPEAKER | Amplified speaker out | Standard |
| SPDIF | Digital audio output | Standard |
| LAN | RJ45 LAN port | Standard |
| DUAL_USB | USB connectors | Standard |
| COM1/2 | RS232 DB9 serial port | Standard |
| PCMCIA | Car bus slot | Standard |

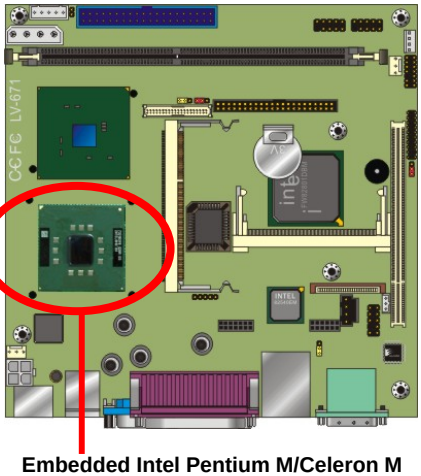
# 2.4 <System Setup>

## 2.4.1 <CPU Installation>

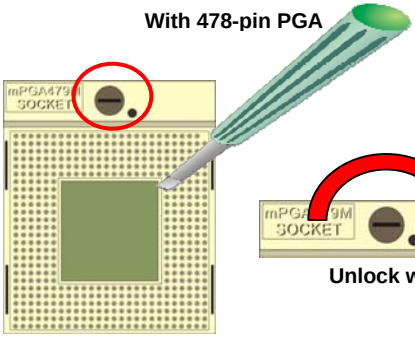
The board supports Intel Pentium M/ Celeron M processor with 400MHz/533MHz of front side bus, 512KB/1MB/2MB of L2 cache, there are two package type of the processor, 478-pin PGA for socket479 onboard version; 479-pin BGA for embedded processor version. Please check installation steps below for onboard socket479 version.



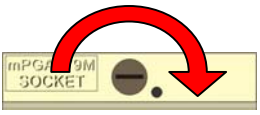
**Socket479 for Intel Pentium M/Celeron M With 478-pin PGA**



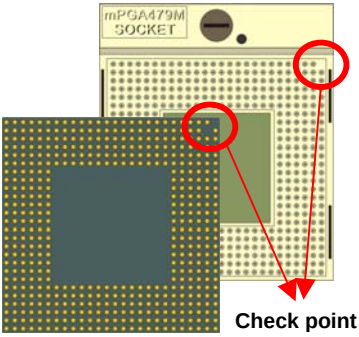
**Embedded Intel Pentium M/Celeron M With 479-pin LV/ULV**




**1. Use the flat-type screw drive to unlock the CPU socket**




**Unlock way**



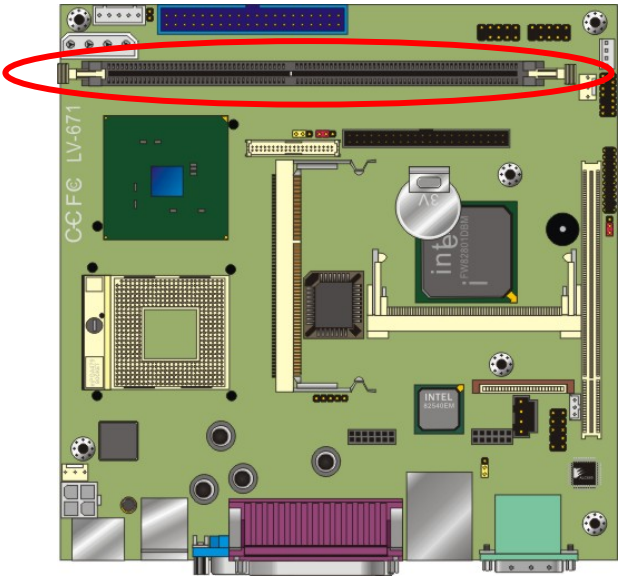

**Check point**

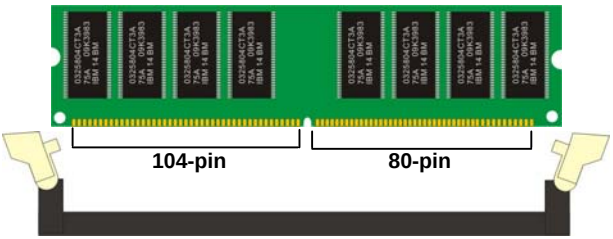
**2. Follow the pin direction to install the processor on the socket**

**3. Lock the socket**

## 2.4.2 <Memory Installation>

The board supports one 184-pin DDR266/333 (PC2100/PC2700) SDRAM up to 1GB of capacity, and supports ECC (Error Correcting Code), unbufferred memory modules.




**Please check the pin number to match the socket side well before installing memory module.**

### 2.4.3 <CPU Cooler Installation>

The board accessories come with one CPU cooler, the cooler's specification is listed below, please check the installation steps before you start.

*Notice: Installing the cooler improperly may cause the system unstable, if you face system rebooting or other issue, please check this point.*

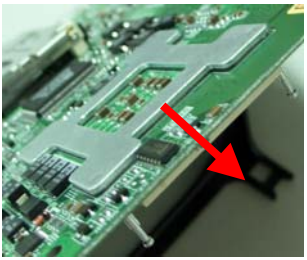
**Cooler Specification:**

| Rated Voltage | Consumption | Sound Level | Rated Speed | Air Flow |
|---|---|---|---|---|
| 12V | Max 0.12Amp | Max 27dB | 5000rpm | Max 4.73CFM |

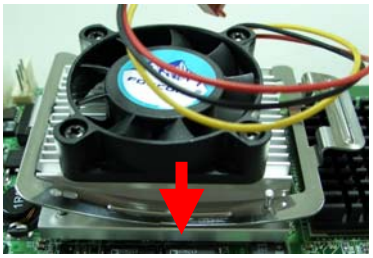
The Cooler can compete with up to 2.0GHz of Intel Pentium M processor, if user needs to use more upper frequency, please replace other coolers.

**Cooler Installation Guide:**

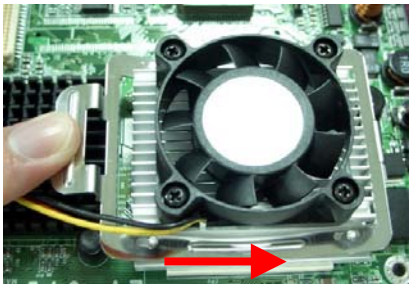
**1. Remove the sticker on the base**



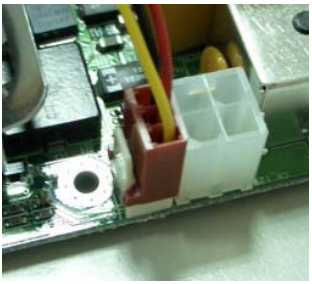
**2. Put the base through the fixing holes**



**3. Put the cooler through the four pills on the base**



**4. Press the plate and move forward**



**4. Connect the fan connector on CPUFAN**

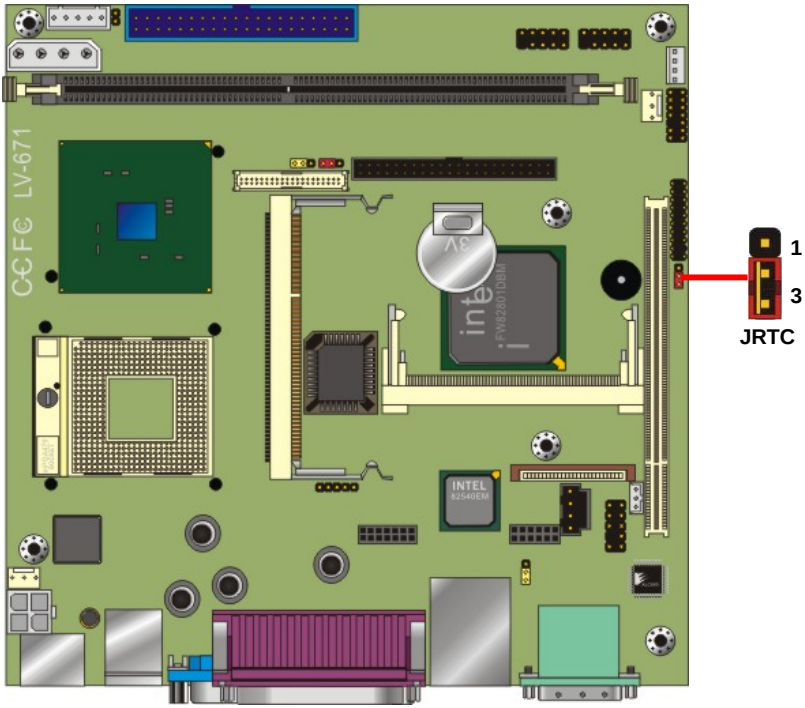
## 2.5 <CMOS Setup>

The board's data of CMOS can be setting in BIOS. If the board refuses to boot due to inappropriate CMOS settings, here is how to proceed to clear (reset) the CMOS to its default values.

Jumper: **JRTC**
Type: Onboard 3-pin Header

| JRTC | Mode |
|---|---|
| 1-2 | Clear CMOS |
| 2-3 | Normal Operation |

Default setting



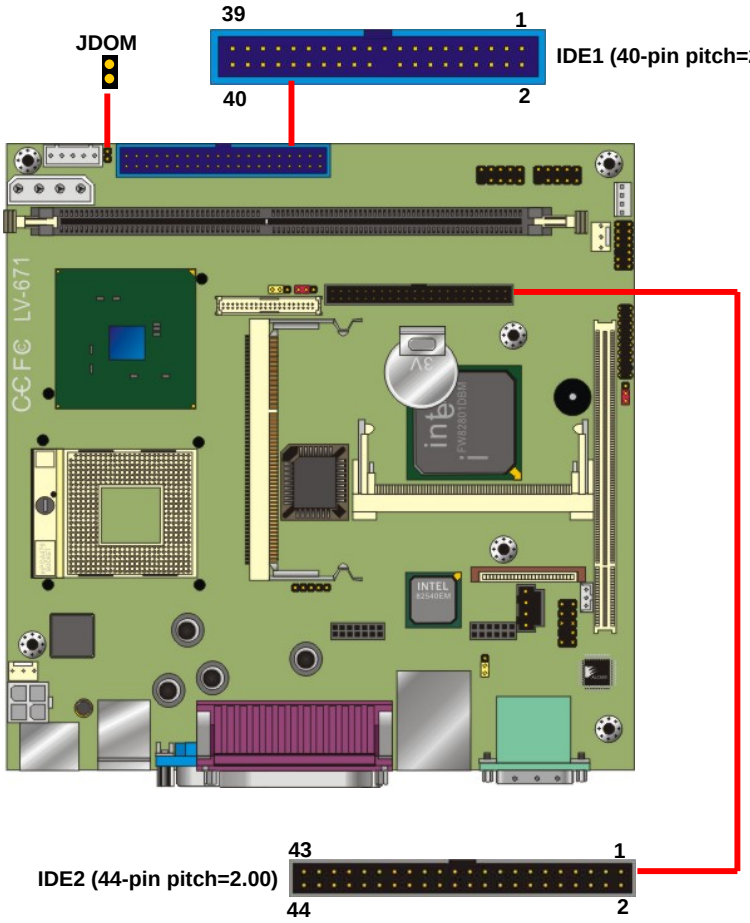
## 2.6 <IDE Interface>

The board supports two IDE interface up to 4 ATAPI devices, base on Intel ICH4, the IDE interface supports ATA66/100 ATAPI drives. The IDE1 supports +5V on pin-20 for DOM (Disk on Module), the jumper JDOM can let you select enable/disable this support.

Jumper: **JDOM**
Type: onboard 3-pin header

| JDOM | Mode |
|---|---|
| ON | IDE1 pin-20 5V power supply enable |
| OFF | No 5V power supply on IDE1 pin-20 |

Default setting



## 2.7 Compact Flash Interface

The board supports Compact Flash Type I socket for storage flash disk only, the jumper **JCFSEL** can let you to setup the flash card operate on secondary master or slave mode.

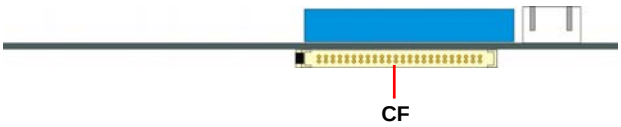
Jumper: **JCFSEL**
Type: onboard 3-pin header

| JCFSEL | Mode |
|---|---|
| 1-2 | Master |
| 2-3 | Slave |

Default setting

Tested Compact Flash Disk

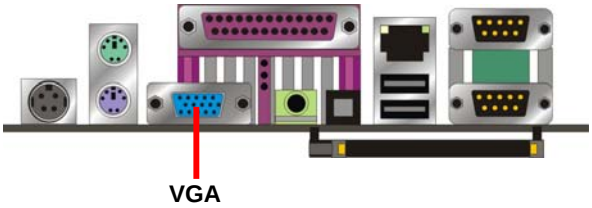
| Manufacture | Capacity |
|---|---|
| LEXAR | 16MB |
| DigitFab | 32MB |
| RiDATA | 256MB |
| HAGIWARA SYS-COM | 512MB |
| Sandisk | 2GB |



# 2.8 <Display Interface>

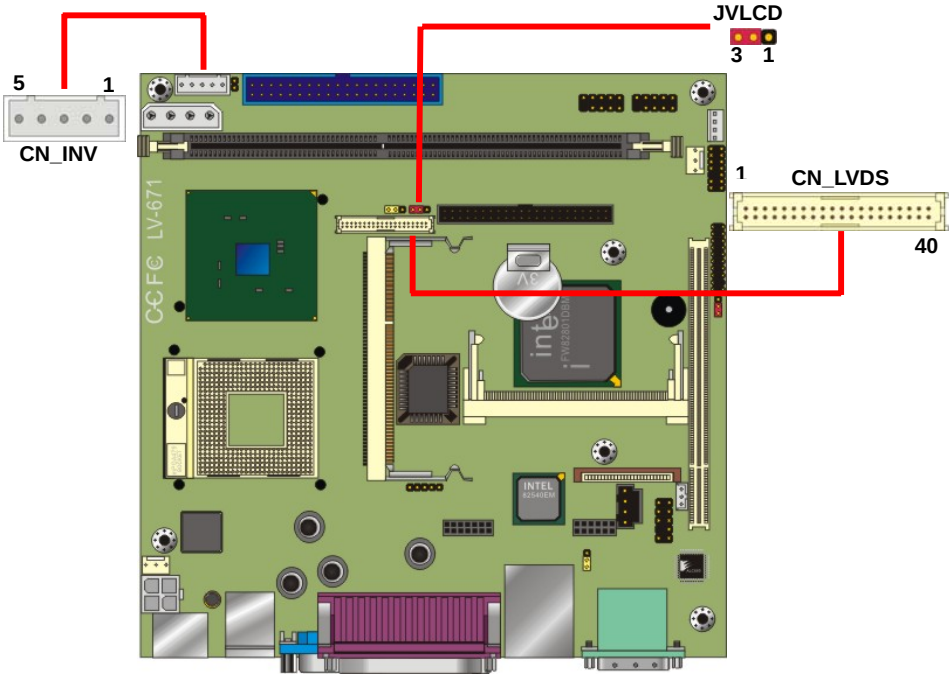
## 2.8.1 <Analog display interface>

The board is integrated with Intel 855GM GMCH chipset built-in Intel Extreme Graphics 2 with 266 MHz VGA core, 256-bit 3D engine and Intel Dynamic Video Memory up to 64MBytes shared with system memory. The CRT / analog VGA interface includes one external DB15 female connector on bracket on board.




## 2.8.2 <Digital display interface>

The board's digital video interface provides LVDS flat panel support. The built-in 18/24-bit dual channel LVDS interface offers the economical solution for LVDS-based LCD display.



Connector: **CN_INV**
Type: 5-pin LVDS Power Header

| Pin | Description |
|---|---|
| 1 | +12V |
| 2 | GND |
| 3 | GND |
| 4 | GND |
| 5 | ENABKL |

Connector: **JVLCD**
Type: 3-pin Power select Header

| Pin | Description |
|---|---|
| 1 | VCC |
| 2 | LCDVCC |
| 3 | VCC3 |

Connector: **CN_LVDS**
Type: onboard 40-pin connector for LVDS connector
Connector model: **HIROSE DF13-40DP-1.25V**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 2 | LCDVCC | 1 | LCDVCC |
| 4 | GND | 3 | GND |
| 6 | ATX0- | 5 | BTX0- |
| 8 | ATX0+ | 7 | BTX0+ |
| 10 | GND | 9 | GND |
| 12 | ATX1- | 11 | BTX1- |
| 14 | ATX1+ | 13 | BTX1+ |
| 16 | GND | 15 | GND |
| 18 | ATX2- | 17 | BTX2- |
| 20 | ATX2+ | 19 | BTX2+ |
| 22 | GND | 21 | GND |
| 24 | ATXCK- | 23 | BTX3- |
| 26 | ATXCK+ | 25 | BTX3+ |
| 28 | GND | 27 | GND |
| 30 | ATX3- | 29 | BTXCK- |
| 32 | ATX3+ | 31 | BTXCK+ |
| 34 | GND | 33 | GND |
| 36 | PANELCLK | 35 | N/C |
| 38 | PANELDATA | 37 | N/C |
| 40 | N/C | 39 | N/C |

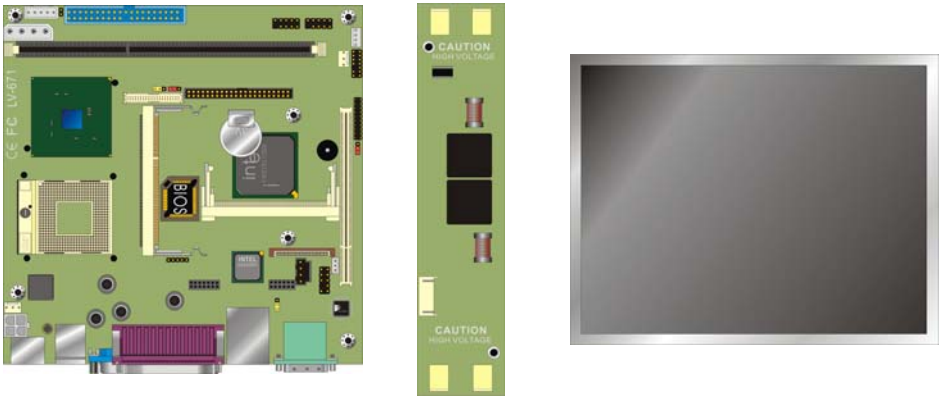
To setup the LCD, you need the components below:

1. A panel (support up to 24-bit dual channel) with LVDS interfaces.
2. An inverter for panel's backlight power.
3. A LCD cable and an inverter cable.

For the cables, please follow the pin assignment of the connector to make a cable, because every panel has its own pin assignment, so we do not provide a standard cable; please find a local cable manufacture to make cables.

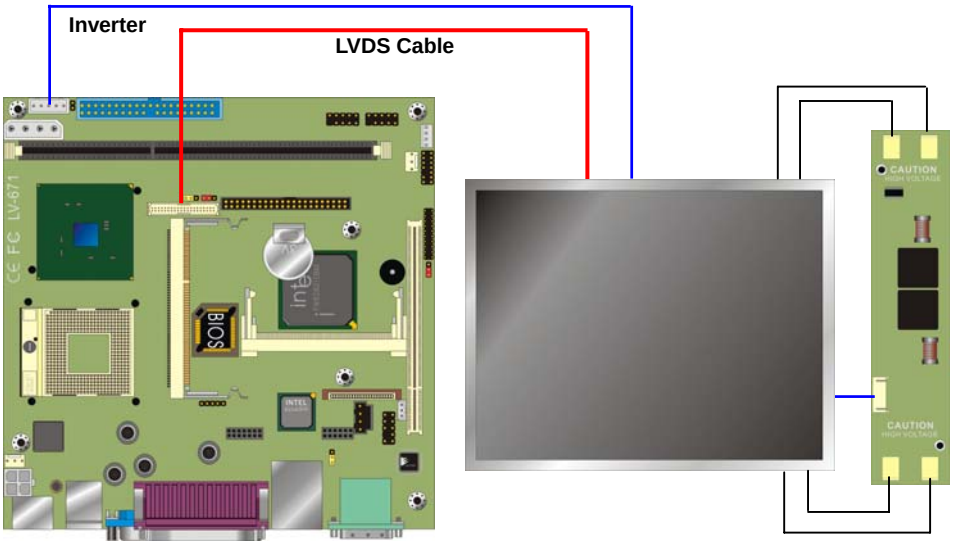
**LCD installing guide:**

1. Prepare a panel, inverter and **LV-671**.

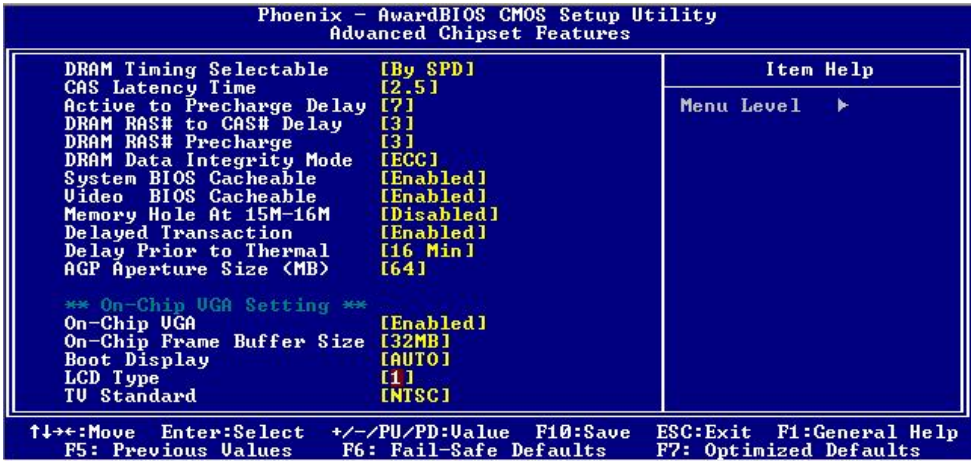



2. Please check the datasheet of the panel to see the voltage of the panel, and set the jumper **JVLCD** to +5V or +3.3V.
3. Prepare a LVDS type LCD cable

4. Connect all the devices well.



After setup the devices well, you need to select the LCD panel type in the BIOS.


Phoenix - AwardBIOS CMOS Setup Utility
Advanced Chipset Features
DRAM Timing Selectable [By SPD]
CAS Latency Time [2.5]
Active to Precharge Delay [7]
DRAM RAS# to CAS# Delay [3]
DRAM RAS# Precharge [3]
DRAM Data Integrity Mode [ECC]
System BIOS Cacheable [Enabled]
Video BIOS Cacheable [Enabled]
Memory Hole At 15M-16M [Disabled]
Delayed Transaction [Enabled]
Delay Prior to Thermal [16 Min]
AGP Aperture Size (MB) [64]
** On-Chip VGA Setting **
On-Chip VGA [Enabled]
On-Chip Frame Buffer Size [32MB]
Boot Display [AUTO]
LCD Type [1]
TV Standard [NTSC]
Item Help
Menu Level ▶
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

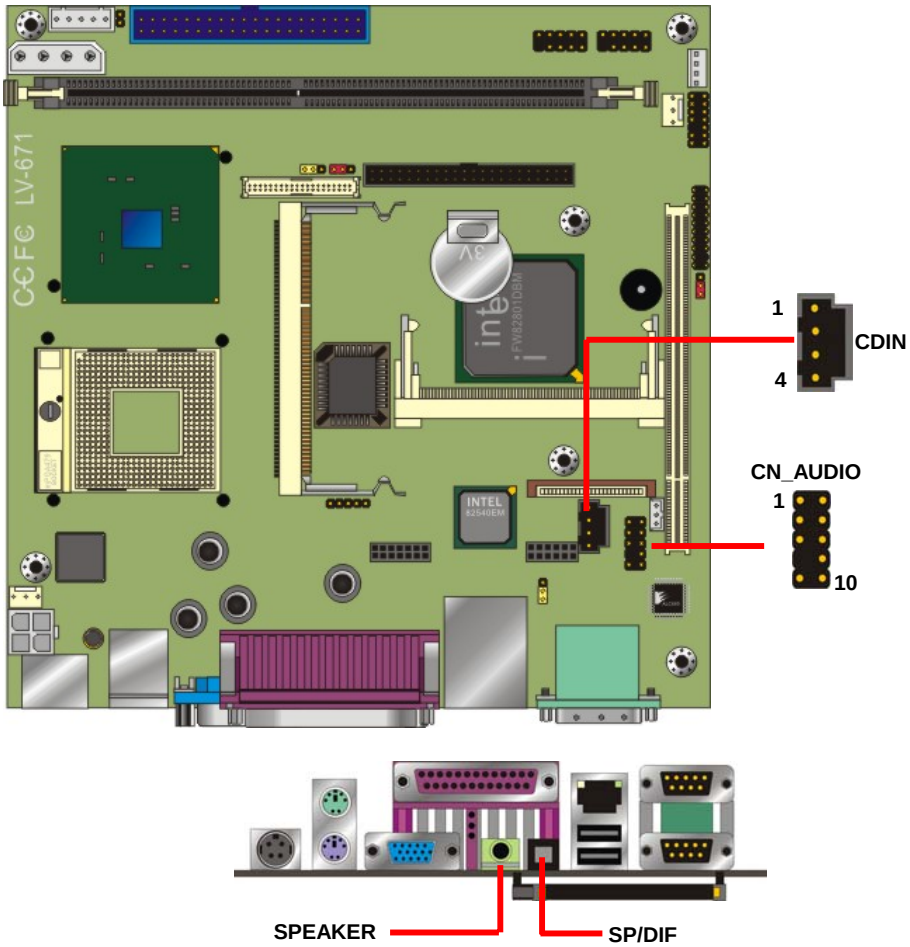
The panel type mapping is list below:

| BIOS panel type selection form | | | |
|---|---|---|---|
| For 18-bit color | | For 24-bit color | |
| NO. | Output format | NO. | Output format |
| 1 | 640 x 480 | 8 | 1024 x 768 |
| 2 | 800 x 600 | 9 | 1280 x 1024 Dual Channel |
| 3 | 1024 x 768 | 10 | 1400 x 1050 Dual Channel |
| 4 | 1280 x 1024 | 11 | 1600 x 1200 Dual Channel |
| 5 | 1400 x 1050 Dual Channel @ 108Mhz | 13 | 1024 x 768 Dual Channel |
| 6 | 1400 x 1050 Dual Channel @ 122Mhz | 14 | |
| 7 | 1600 x 1200 Dual Channel | 15 | 1280 x 768Dual Channel |
| 12 | 1024 x 768 Dual Channel | | |

## 2.9 <Audio Interface>

The board integrates Intel ICH4 with REALTEK ALC655 codec for AC97 Rev 2.3; it comes with the features below:

- Microsoft WHQL/WLP 2.0 audio compliance
- Software selectable for 2-channel/5.1-channel sound
- 16-bit Stereo full-duplex CODEC with 48KHz sampling rate
- Two software selectable MIC inputs
- Supports 20-bit 48KHz S/PDIF output, complying with AC'97 Rev 2.3 specifications
- EAX™ 1.0 & 2.0, Direct Sound 3D™, A3D™ compatible



**Connector: CN_AUDIO**

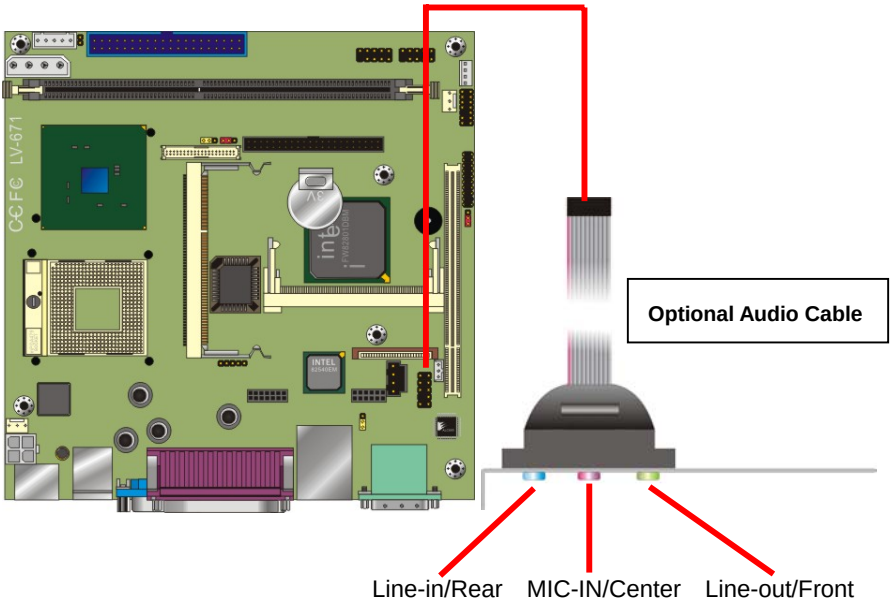
Type: 10-pin (2 x 5) 2.54-pitch header

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | Line – Right | 2 | Ground |
| 3 | Line – Left | 4 | MIC |
| 5 | MIC | 6 | Ground |
| 7 | N/C | 8 | Line Out – Left |
| 9 | Line Out – Right | 10 | Ground |

**Connector: CDIN**

Type: 4-pin header

| Pin | Description |
|---|---|
| 1 | CD – Left |
| 2 | Ground |
| 3 | Ground |
| 4 | CD – Right |



## 2.10 <Ethernet Interface>

The board integrates with Intel 82540EM Gigabit controller at the type of 10Base-T/100Base-TX/1000Base-T auto-switching Ethernet with full duplex and IEEE 802.3U compliant. The LAN function comes with a RJ45 jack on the rear I/O panel. The **CN_WOL** is for the Wake-Up-On-LAN function link with PCI LAN Card.

Connector: **CN_WOL**

Type: onboard 3-pin (1 x 3) wafer connector

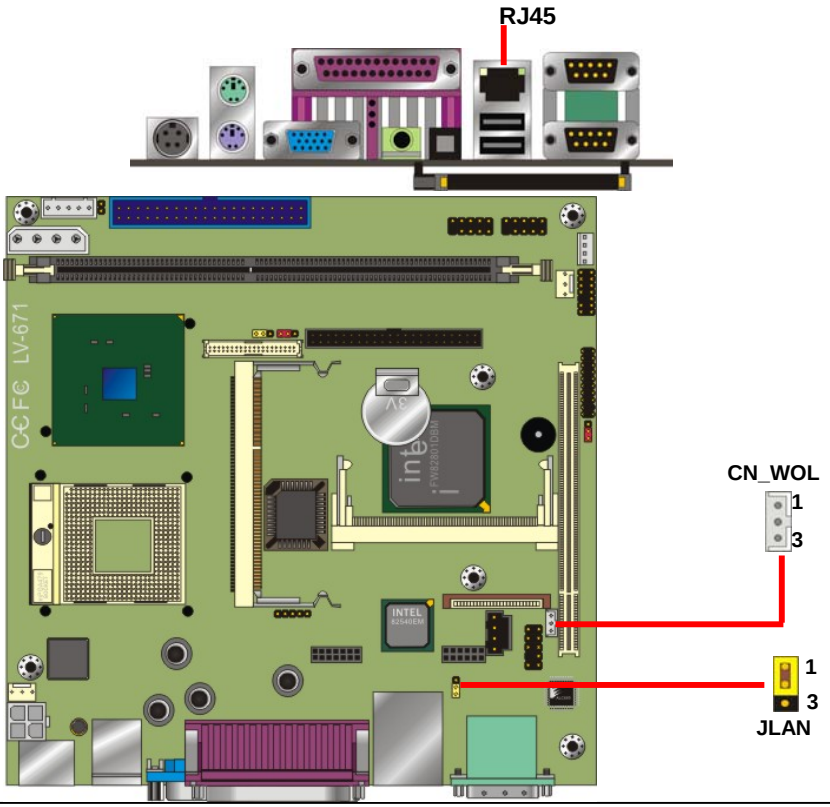
| Pin | 1 | 2 | 3 |
|---|---|---|---|
| Description | WOL-Ctrl | Ground | +5V Standby |

Jumper: **JLAN**

Type: onboard 3-pin header

| JRTC | Mode |
|---|---|
| 1-2 | Enable Onboard LAN controller |
| 2-3 | Disable Onboard LAN controller |

Default setting



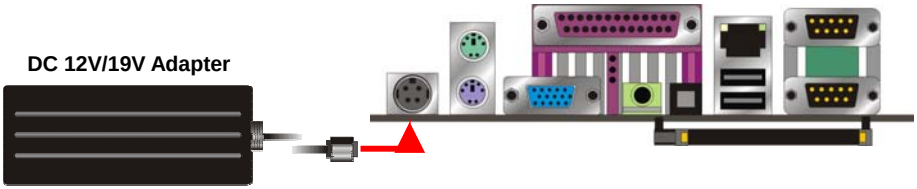
## 2.11 <Power and Fan connector>

The board comes with a 4-pin Mini-DIN power connector for DC 12V/19V auto-switching input, it also has one 4-pin P4 additional use power connector for internal power supply, you can choose one pf them to meet your application.

The board has two power connectors for 5V/12V output to powering your ATAPI drives directly, and it has two fan connectors for CPU and system cooling.

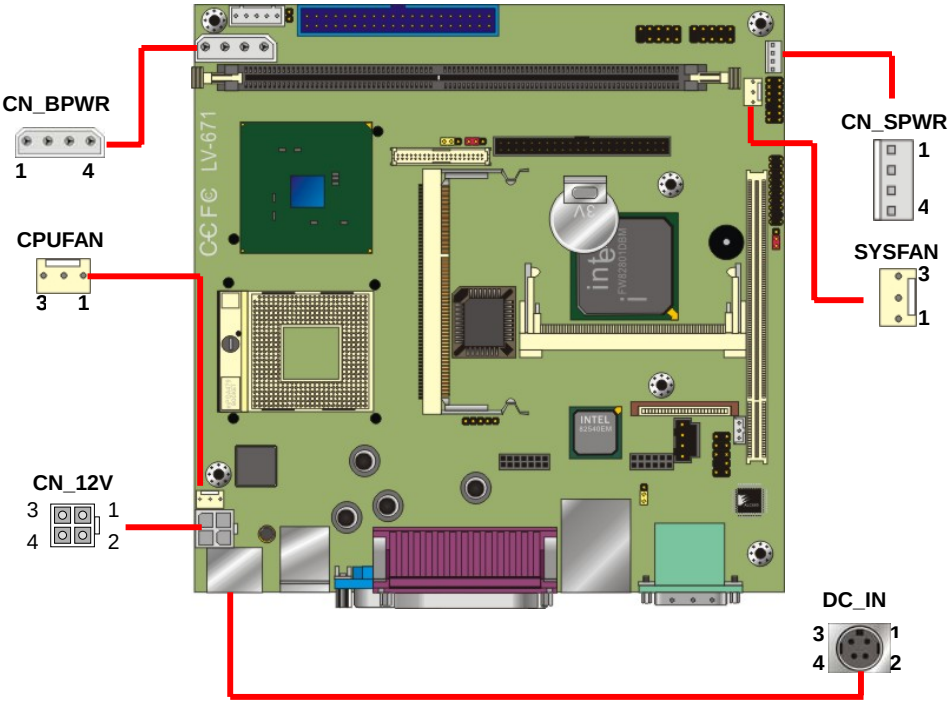
**How to power the board**

**Type 1: Use DC 12V/19V adapter with 4-pin MINI-DIN connector for DC_IN**




**Type 2: Use standard internal P4 power supply for CN_12V**

***We strongly recommend users to use type 1 for powering the board.***



Connector: **CN_12V**

Type: 4-pin standard Pentium 4 +12V power connector

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | +12V | 2 | +12V |
| 3 | Ground | 4 | Ground |

Connector: **DC_IN**

Type: 4-pin DC power connector

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | +12V | 2 | Ground |
| 3 | +12V | 4 | Ground |

Connector: **CPUFAN**, **SYSFAN**

Type: 3-pin fan wafer connector

| Pin | Description | Pin | Description | Pin | Description |
|---|---|---|---|---|---|
| 1 | Ground | 2 | +12V | 3 | Fan Control |

Connector: **CN_BPWR**

Type: 4-pin P-type connector for +5V/+12V **output**

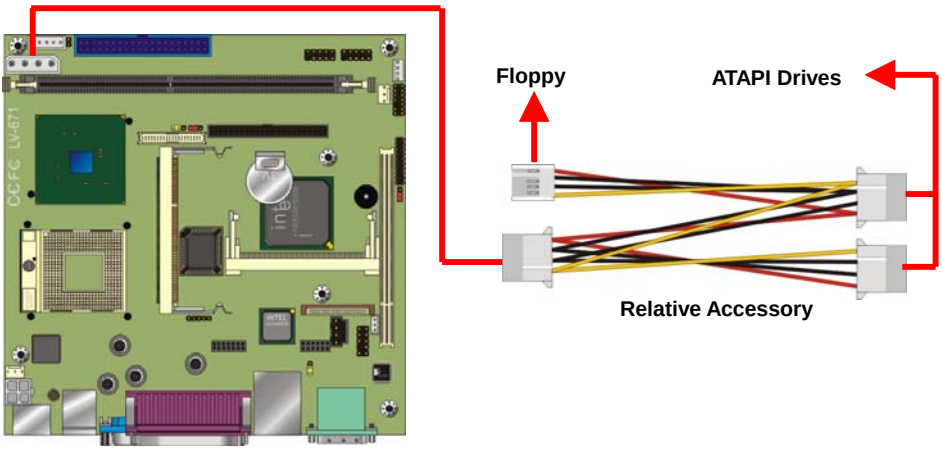
| Pin | Description | Pin | Description | Pin | Description | Pin | Description |
|---|---|---|---|---|---|---|---|
| 1 | +5V | 2 | Ground | 3 | Ground | 4 | +12V |

*Note: Maximum output voltage: 12V/5A & 5V/3A*

Connector: **CN_SPWR**

Type: 4-pin connector for +5V/+12V **output**

| Pin | Description | Pin | Description | Pin | Description | Pin | Description |
|---|---|---|---|---|---|---|---|
| 1 | +12V | 2 | Ground | 3 | Ground | 4 | +5V |

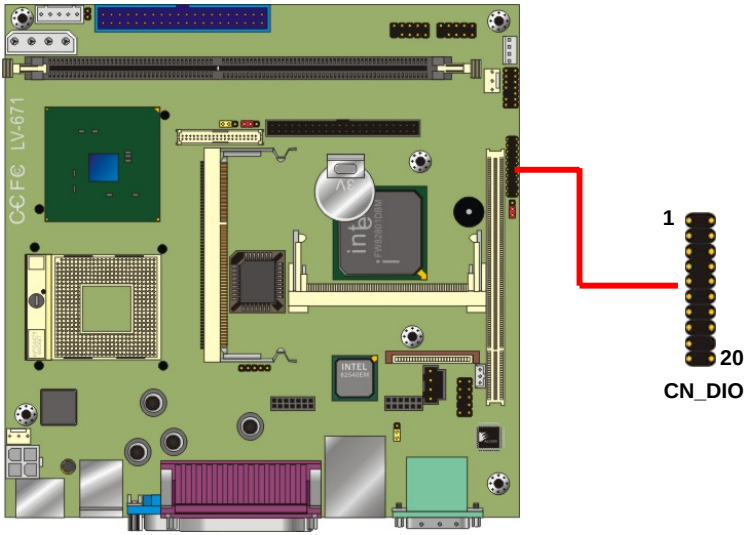


## 2.12 <GPIO Interface>

The board offers 16-bit digital I/O to customize its configuration to your control needs. For example, you may configure the digital I/O to control the opening and closing of the cash drawer or to sense the warning signal from a tripped UPS.

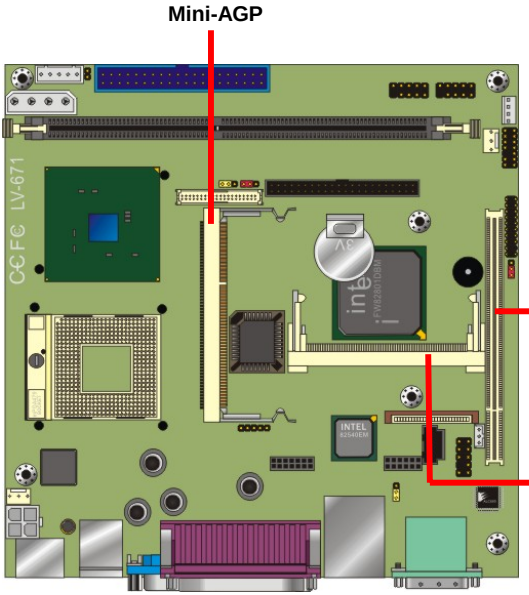
Connector: **CN_DIO**
Type: 20-pin (10 x 2) header

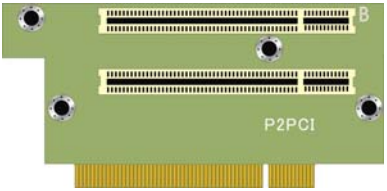
| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | GP10 | 2 | GP20 |
| 3 | GP11 | 4 | GP21 |
| 5 | GP12 | 6 | GP22 |
| 7 | GP13 | 8 | GP23 |
| 9 | Ground | 10 | Ground |
| 11 | GP14 | 12 | GP24 |
| 13 | GP15 | 14 | GP25 |
| 15 | GP16 | 16 | GP26 |
| 17 | GP17 | 18 | N/C |
| 19 | 12VDU | 20 | 5VDU |



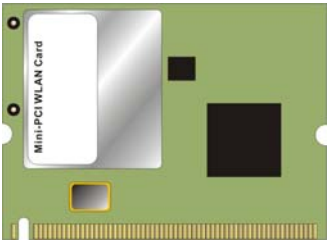
## 2.13 <Expansive Interface>

The board comes with one slim type PCI slot and one optional Mini-AGP or Mini-PCI interface. The slim PCI slot supports up to 2 PCI devices through an optional riser card. For Mini-PCI interface, you can obtain a wireless LAN card for potable system. For Mini-AGP interface, you can obtain an extended graphic card to improve the onboard graphics performance.

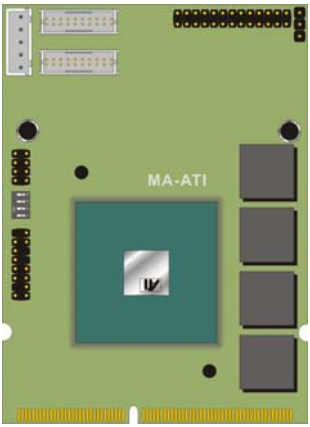



Optional PCI Riser Card




Optional Mini-PCI Wireless LAN Card



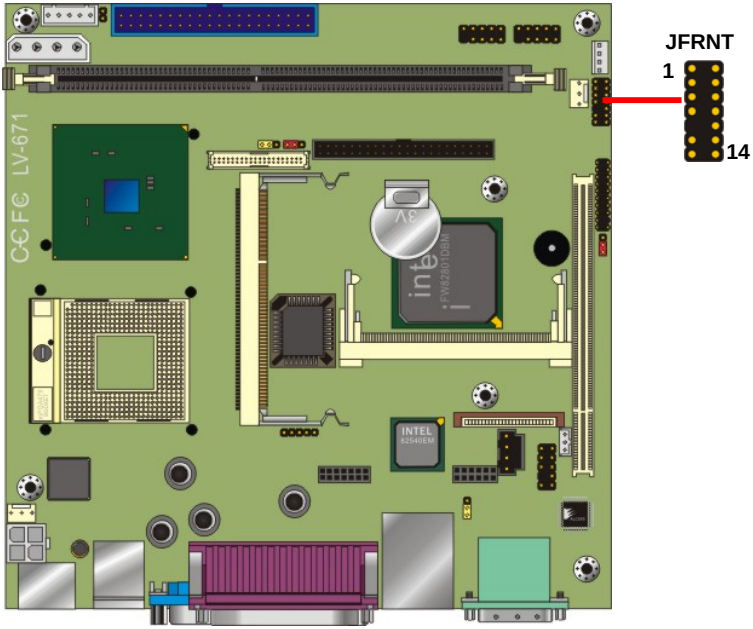

Optional MA-ATI Mini-AGP Card

## 2.14 <Switch and Indicator>

Connector: **JFRNT**

Type: onboard 14-pin (2 x 7) 2.54-pitch header

| Function | Signal | PIN | | Signal | Function |
|---|---|---|---|---|---|
| IDE LED | Vcc (+) | 1 | 2 | (+) Vcc | Power LED |
| | Active | 3 | 4 | N/C | |
| Reset | Reset | 5 | 6 | GND | |
| | GND | 7 | 8 | Vcc | Speaker |
| | N/C | 9 | 10 | N/C | |
| Power Button | PWRBT | 11 | 12 | N/C | |
| | 5VSB | 13 | 14 | SPKIN | |



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# Chapter 3 <System Setup>

## 3.1 <Watchdog Timer Setting>

The watchdog timer makes the system auto-reset while it stops to work for a period. The integrated watchdog timer can be setup as system reset mode by program.

**Timeout Value Range**

- 1 to 255
- Second or Minute

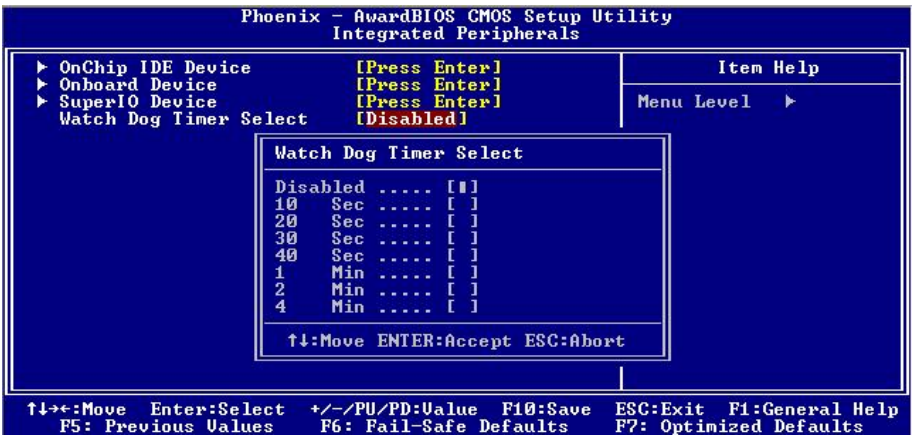
**Program Sample**

Watchdog timer setup as system reset with 5 second of timeout

| | |
|---|---|
| 2E, 87 | |
| 2E, 87 | |
| 2E, 07 | |
| 2F, 08 | Logical Device 8 |
| 2E, 30 | Activate |
| 2F, 01 | |
| 2E, F5 | Set as Second* |
| 2F, 00 | |
| 2E, F6 | Set as 5 |
| 2F, 05 | |

* Minute: bit 3 = 0; Second: bit 3 = 1

You can select Timer setting in the BIOS, after setting the time options, the system will reset according to the period of your selection.


Phoenix - AwardBIOS CMOS Setup Utility
Integrated Peripherals
OnChip IDE Device [Press Enter]
Onboard Device [Press Enter]
SuperIO Device [Press Enter]
Watch Dog Timer Select [Disabled]
Item Help
Menu Level
Watch Dog Timer Select
Disabled ..... [ ]
10 Sec ..... [ ]
20 Sec ..... [ ]
30 Sec ..... [ ]
40 Sec ..... [ ]
1 Min ..... [ ]
2 Min ..... [ ]
4 Min ..... [ ]
↑↓:Move ENTER:Accept ESC:Abort
↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

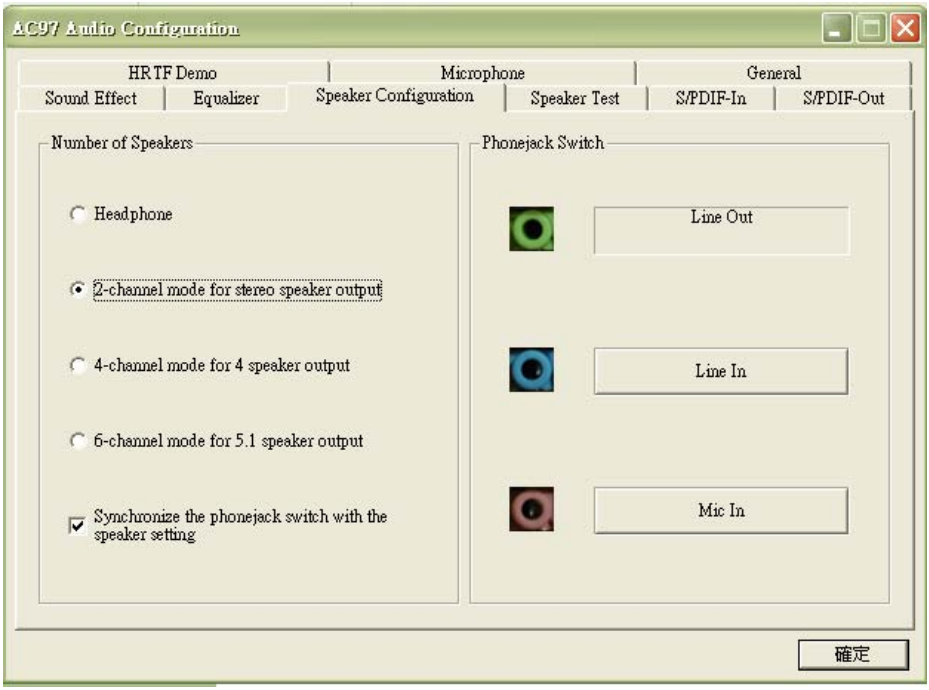
## 3.2 <Audio Setting>

The board integrates Intel® ICH4 with REALTEK® ALC655 codec. It can support 2-channel or 5.1 channel sound under system configuration. Please follow the steps below to setup your sound system.

1. Install REALTEK AC97 Audio driver.

2. Lunch the control panel and Sound Effect Manager.

3. Select Speaker Configuration




4. Select the sound mode to meet your speaker system.

## 3.3 <Display Device Setup>

This chapter shows you how to setup the display device under Windows OS.

**Before you using your display device:**

1. Check your software

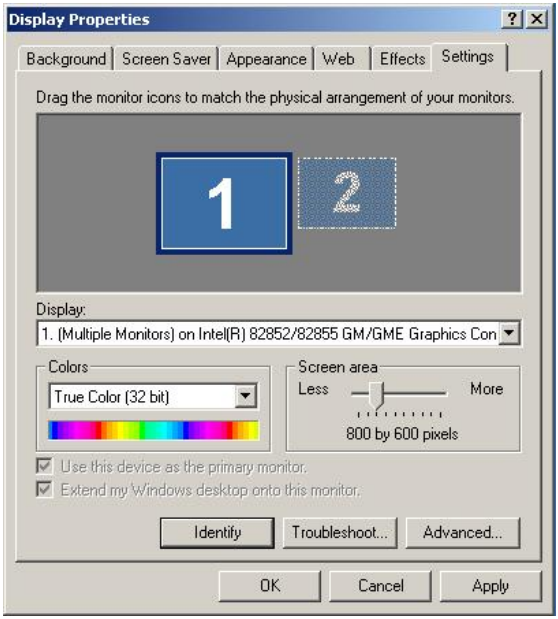
Before you can use the display device properly, please install the VGA driver.

2. Check your hardware

Please setup the display device properly before you boot up the system.

**For configure your Display device, please follow the instructions below:**

1. Please lunch Display Properties.

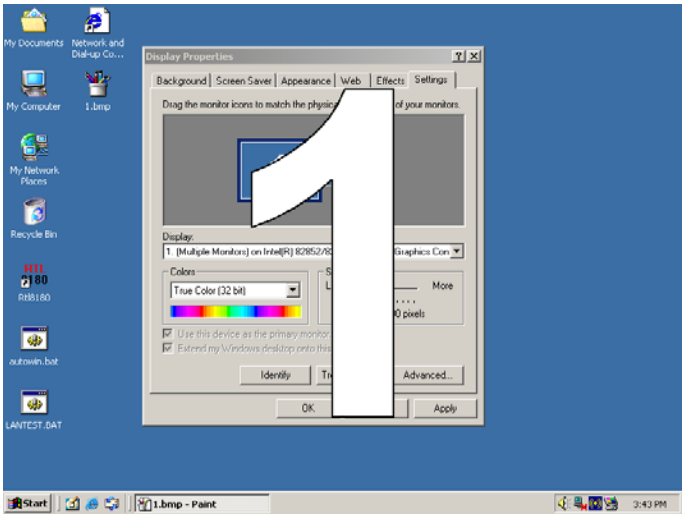



You would see two Graphics Controllers. If you connect two display devices, you would be able to setup each device for color bit and resolution.

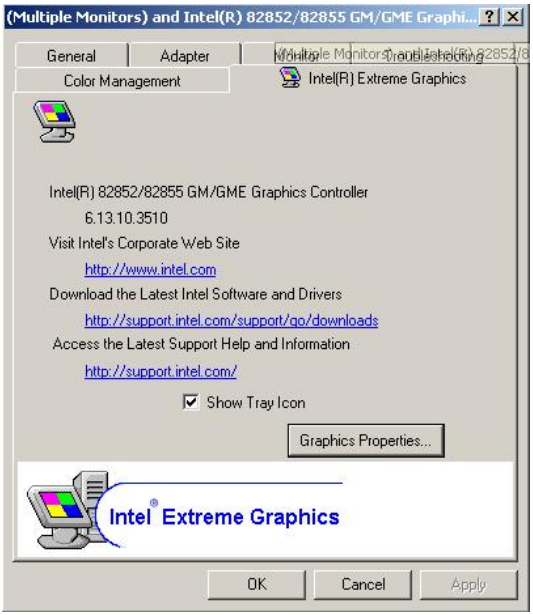
This item can let you configure which device would be the primary if you connect two display devices.

This item can let you extend your Windows Desktop to second display device.

If you click the identify button, the screen will pop up the number sequence of your device.

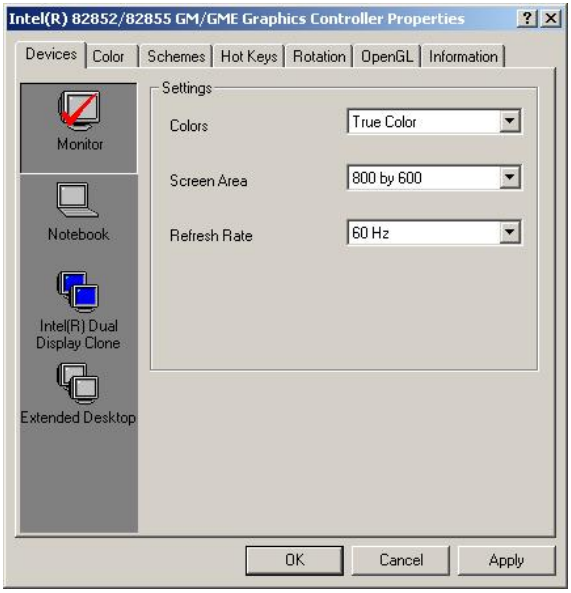



For advanced display settings, please click Advanced… button and choose Intel(R) Extreme Graphics.

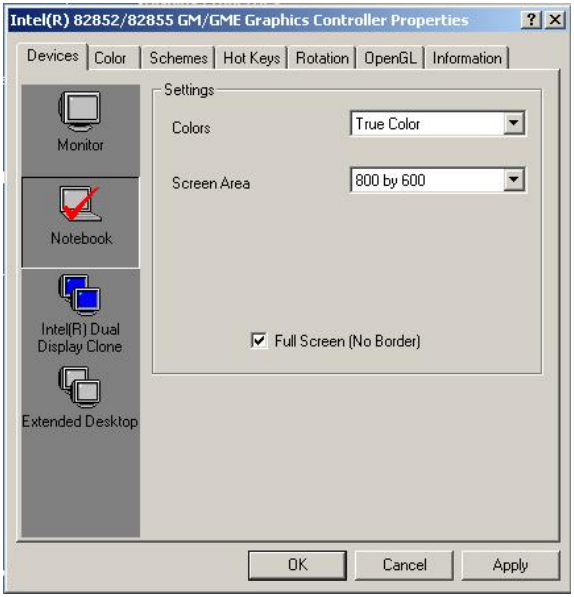



Please click Graphics Properties button to enter the advanced setup.

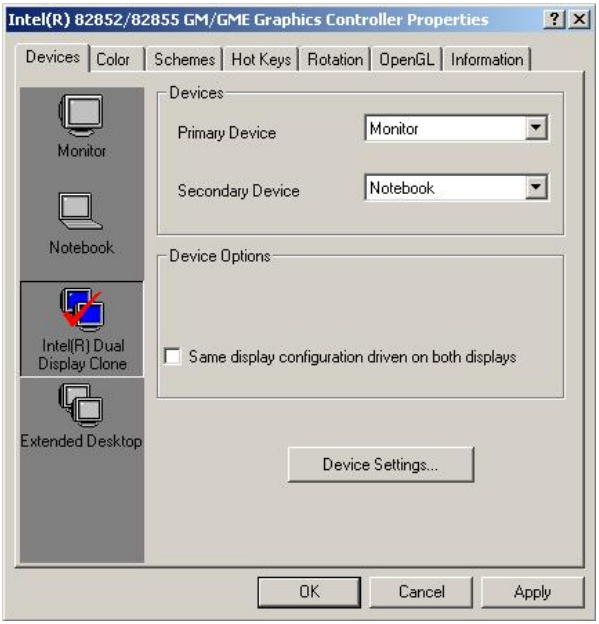
While you entering the Graphics Properties, you will see the options below:



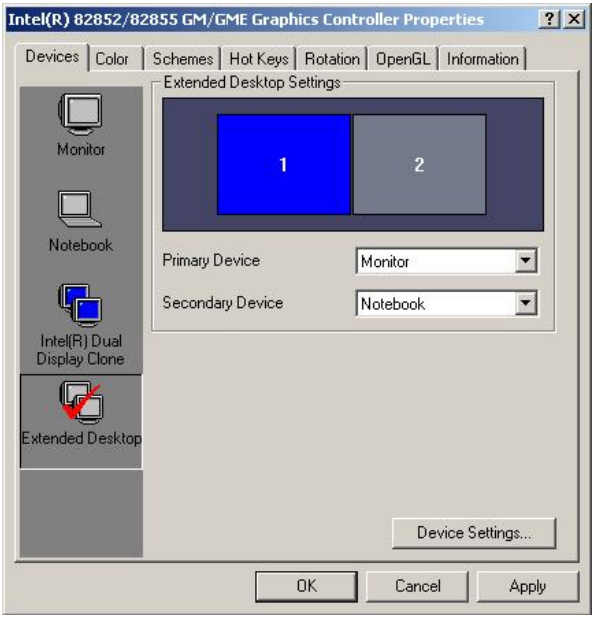

**This option can let you configure the CRT monitors for Colors, Screen Area (Resolution) and Refresh Rate.**




**This option can let you configure the LCD panel for Colors, Screen Area (Resolution) and Full Screen option.**




**This option can let you configure the Dual Display for clone mode (same display on two devices)**




**This option can let you configure the Dual Display for Extended Desktop mode**

# Chapter 4 <BIOS Setup>

The single board computer uses the Award BIOS for the system configuration. The Award BIOS in the single board computer is a customized version of the industrial standard BIOS for IBM PC AT-compatible computers. It supports Intel x86 and compatible CPU architecture based processors and computers. The BIOS provides critical low-level support for the system central processing, memory and I/O sub-systems.

The BIOS setup program of the single board computer let the customers modify the basic configuration setting. The settings are stored in a dedicated battery-backed memory, NVRAM, retains the information when the power is turned off. If the battery runs out of the power, then the settings of BIOS will come back to the default setting.

The BIOS section of the manual is subject to change without notice and is provided here for reference purpose only. The settings and configurations of the BIOS are current at the time of print, and therefore they may not be exactly the same as that displayed on your screen.

To activate CMOS Setup program, press ＜DEL＞ key immediately after you turn on the system. The following message "Press DEL to enter SETUP" should appear in the lower left hand corner of your screen. When you enter the CMOS Setup Utility, the Main Menu will be displayed as **Figure 5-1**. You can use arrow keys to select your function, press ＜Enter＞ key to accept the selection and enter the sub-menu.

**Figure 5-1** CMOS Setup Utility Main Screen

Phoenix - AwardBIOS CMOS Setup Utility
Standard CMOS Features
Advanced BIOS Features
Advanced Chipset Features
Integrated Peripherals
Power Management Setup
PnP/PCI Configurations
PC Health Status
Frequency/Voltage Control
Load Fail-Safe Defaults
Load Optimized Defaults
Set Supervisor Password
Set User Password
Save & Exit Setup
Exit Without Saving
Esc : Quit F9 : Menu in BIOS ↑ ↓ → ← : Select Item
F10 : Save & Exit Setup
Time, Date, Hard Disk Type...

For more BIOS information please visit Phoenix-Award:

http://www.phoenix.com/en/customer+services/bios/awardbios/default1.htm

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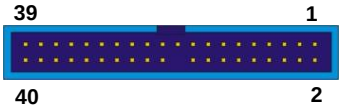
# Appendix A <I/O Port Pin Assignment>

## A.1 <IDE Port>




Connector: **IDE1**
Type: 40-pin (20 x 2) box header

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | Reset | 2 | Ground |
| 3 | D7 | 4 | D8 |
| 5 | D6 | 6 | D9 |
| 7 | D5 | 8 | D10 |
| 9 | D4 | 10 | D11 |
| 11 | D3 | 12 | D12 |
| 13 | D2 | 14 | D13 |
| 15 | D1 | 16 | D14 |
| 17 | D0 | 18 | D15 |
| 19 | Ground | 20 | VCC (**JDOM**) |
| 21 | REQ | 22 | Ground |
| 23 | IOW-/STOP | 24 | Ground |
| 25 | IOR-/HDMARDY | 26 | Ground |
| 27 | IORDY/DDMARDY | 28 | IDESEL |
| 29 | DACK- | 30 | Ground |
| 31 | IRQ | 32 | N/C |
| 33 | A1 | 34 | CBLID |
| 35 | A0 | 36 | A2 |
| 37 | CS1 (MASTER CS) | 38 | CS3 (SLAVE CS) |
| 39 | LED ACT- | 40 | Ground |

Connector: **IDE2**

Type: 44-pin (22 x 2) box header

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | Reset | 2 | Ground |
| 3 | D7 | 4 | D8 |
| 5 | D6 | 6 | D9 |
| 7 | D5 | 8 | D10 |
| 9 | D4 | 10 | D11 |
| 11 | D3 | 12 | D12 |
| 13 | D2 | 14 | D13 |
| 15 | D1 | 16 | D14 |
| 17 | D0 | 18 | D15 |
| 19 | Ground | 20 | N/C |
| 21 | REQ | 22 | Ground |
| 23 | IOW-/STOP | 24 | Ground |
| 25 | IOR-/HDMARDY | 26 | Ground |
| 27 | IORDY/DDMARDY | 28 | IDESEL |
| 29 | DACK- | 30 | Ground |
| 31 | IRQ | 32 | N/C |
| 33 | A1 | 34 | CBLID |
| 35 | A0 | 36 | A2 |
| 37 | CS1 | 38 | CS3 |
| 39 | IDEACT- | 40 | Ground |
| 41 | VCC | 42 | VCC |
| 43 | Ground | 44 | Ground |

## A.2 <Floppy Port>

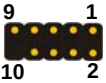
Connector: **FDD**

Type: 26-pin connector

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | VCC | 2 | INDEX |
| 3 | VCC | 4 | DRV0 |
| 5 | VCC | 6 | DSKCHG |
| 7 | DRV1 | 8 | N/C |
| 9 | MTR1 | 10 | MTR0 |
| 11 | RPM | 12 | DIR |
| 13 | N/C | 14 | STEP |
| 15 | Ground | 16 | WRITE DATA |
| 17 | Ground | 18 | WRITE GATE |
| 19 | N/C | 20 | TRACK 0 |
| 21 | N/C | 22 | WRPTR |
| 23 | Ground | 24 | RDATA- |
| 25 | Ground | 26 | SEL |

## A.3 < USB Interface >

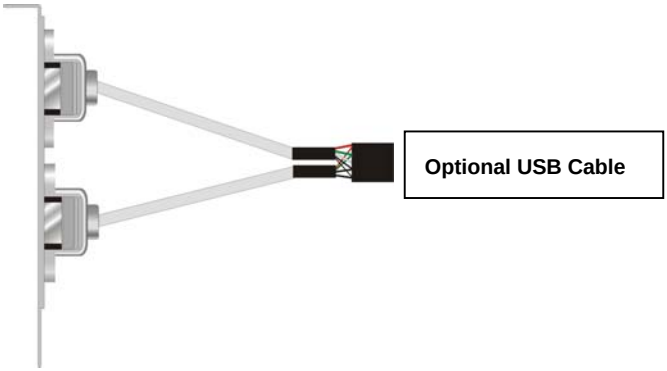
Connector: **CN_USB1**, **CN_USB2**




Type: 10-pin (5 x 2) header for dual USB Ports

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | VCC | 2 | VCC |
| 3 | Data0- | 4 | Data1- |
| 5 | Data0+ | 6 | Data1+ |
| 7 | Ground | 8 | Ground |
| 9 | N/C | 10 | N/C |

PS. You can obtain an optional USB cable on bracket for to 2 USB ports.



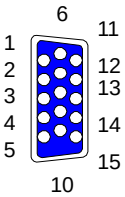
## A.4 <IrDA Port>

Connector: **CN_IR**

Type: 5-pin header for SIR Ports

| Pin | Description |
|---|---|
| 1 | VCC |
| 2 | N/C |
| 3 | IRRX |
| 4 | Ground |
| 5 | IRTX |

## A.5 < VGA Port >




Connector: **VGA**

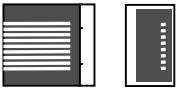
Type: 15-pin D-sub female connector on bracket

| Pin | Description | Pin | Description | Pin | Description |
|---|---|---|---|---|---|
| 1 | RED | 6 | Ground | 11 | N/C |
| 2 | GREEN | 7 | Ground | 12 | 5VCDA |
| 3 | BLUE | 8 | Ground | 13 | HSYNC |
| 4 | N/C | 9 | LVGA5V | 14 | VSYNC |
| 5 | Ground | 10 | Ground | 15 | 5VCLK |

## A.6 < LAN Port >

Connector: **RJ45**

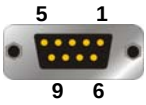
Type: RJ45 connector with LED on bracket



| Pin | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| Description | MI0+ | MI0- | MI1+ | MI2+ | MI2- | MI1- | MI3+ | MI3- |

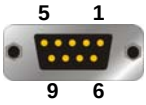
## A.7 < Serial Port >

Connector: **COM1**
Type: 9-pin D-sub male connector on bracket




| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | MDCD1- | 6 | MDSR1- |
| 2 | MSIN1- | 7 | MRTS1- |
| 3 | MSO1- | 8 | MCTS1- |
| 4 | MDTR1- | 9 | MRI1- |
| 5 | Ground | | |

Connector: **COM2**
Type: 9-pin D-sub male connector on bracket




| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | MDCD2- | 6 | MDSR2- |
| 2 | MSIN2- | 7 | MRTS2- |
| 3 | MSO2- | 8 | MCTS2- |
| 4 | MDTR2- | 9 | MRI2- |
| 5 | Ground | | |

Output Voltage: +/- 9V.

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# Appendix B <Flash BIOS>

## B.1 <Flash Tool>

The board is based on Award BIOS and can be updated easily by the BIOS auto flash tool. You can download the tool online at the address below:

http://www.phoenix.com/en/home/
http://www.commell.com.tw/Support/Support_SBC.htm

File name of the tool is "awdflash.exe", it's the utility that can write the data into the BIOS flash ship and update the BIOS.

## B.2 <Flash BIOS Procedure>

1. Please make a bootable floppy disk.
2. Get the last .bin files you want to update and copy it into the disk.
3. Copy awardflash.exe to the disk.
4. Power on the system and flash the BIOS. (Example: C:/ awardflash XXX.bin)
5. Restart the system.

Any question about the BIOS re-flash please contact your distributors or visit the web-site at below:
http://www.commell.com.tw/support/support.htm

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# Appendix C <System Resource>

## C.1 <I/O Address Map>

| Address Range | Device |
|---|---|
| x0000 - x000F | Direct Memory Access Controller |
| x0010 - x001F | Motherboard Resource |
| x0020 - x0021 | Programmable Interrupt Controller |
| x0022 - x003F | Motherboard Resource |
| x0040 - x0043 | System Clock |
| x0044 - x005F | Motherboard Resource |
| x0060 - x0060 | Standard 101/102-Key or Microsoft Natural Keyboard |
| x0061 - x0061 | System Speaker |
| x0062 - x0063 | Motherboard Resource |
| x0064 - x0064 | Standard 101/102-Key or Microsoft Natural Keyboard |
| x0065 - x006F | Motherboard Resource |
| x0070 - x0073 | System CMOS/ Real Time Clock |
| x0074 - x007F | Motherboard Resource |
| x0080 - x0090 | Direct Memory Access Controller |
| x0091 - x0093 | Motherboard Resource |
| x0094 - x009F | Direct Memory Access Controller |
| x00A0 - x00A1 | Programmable Interrupt Controller |
| x00A2 - x00BF | Motherboard Resource |
| x00C0 - x00DF | Direct Memory Access Controller |
| x00E0 - x00EF | Motherboard Resource |
| x00F0 - x00FF | Numeric Data Processor |
| x0170 - x0177 | Intel(R) 82801DB Ultra ATA Storage Controller - 24CB |
| x0170 - x0177 | Secondary IDE controller (dual fifo) |
| x01F0 - x01F7 | Intel(R) 82801DB Ultra ATA Storage Controller - 24CB |
| x01F0 - x01F7 | Primary IDE controller (dual fifo) |
| x0294 - x0297 | Motherboard Resource |
| x02F8 - x02FF | Communication Port (COM2) |
| x0376 - x0376 | Intel(R) 82801DB Ultra ATA Storage Controller - 24CB |
| x0376 - x0376 | Secondary IDE controller (dual fifo) |
| x0378 - x037F | Printer Port (LPT1) |
| x03B0 - x03BB | Intel(R) 82852/82855 GM/GME Graphics Controller |
| x03C0 - x03DF | Intel(R) 82852/82855 GM/GME Graphics Controller |
| x03F0 - x03F5 | Standard Floppy Controller |
| x03F6 - x03F6 | Intel(R) 82801DB Ultra ATA Storage Controller - 24CB |
| x03F6 - x03F6 | Primary IDE controller (dual fifo) |
| x03F7 - x03F7 | Standard Floppy Controller |

| | |
|---|---|
| x03F8 - x03FF | Communication Port (COM1) |
| x0400 - x04BF | Motherboard Resource |
| x04D0 - x04D1 | Motherboard Resource |
| x0500 - x051F | Intel(R) 82801DB/DBM SMBus Controller - 24C3 |
| x0778 - x077B | Printer Port (LPT1) |
| x0A78 - x0A7B | Motherboard Resource |
| x0B78 - x0B7B | Motherboard Resource |
| x0BBC - x0BBF | Motherboard Resource |
| x0CF8 - x0CFF | PCI Bus |
| x0E78 - x0E7B | Motherboard Resource |
| x0F78 - x0F7B | Motherboard Resource |
| x0FBC - x0FBF | Motherboard Resource |
| xA000 - xBFFF | Intel(R) 82801DB PCI Bridge - 244E |
| xB000 - xB03F | Intel(R) PRO/1000 MT Network Connection |
| xC000 - xC01F | Intel(R) 82801DB/DBM USB Universal Host Controller |
| xC400 - xC41F | Intel(R) 82801DB/DBM USB Universal Host Controller |
| xC800 - xC81F | Intel(R) 82801DB/DBM USB Universal Host Controller |
| xCC00 - xCC07 | Intel(R) 82852/82855 GM/GME Graphics Controller |
| xD400 - xD4FF | Realtek AC'97 Audio |
| xD800 - xD83F | Realtek AC'97 Audio |
| xF000 - xF007 | Primary IDE controller (dual fifo) |
| xF000 - xF00F | Intel(R) 82801DB Ultra ATA Storage Controller - 24CB |
| xF008 - xF00F | Secondary IDE controller (dual fifo) |

# C.2 <Memory Address Map>

| Range | Device |
|---|---|
| x00000000 - x0009FFFF | System board extension for ACPI BIOS |
| x000A0000 - x000AFFFF | Intel(R) 82852/82855 GM/GME Graphics Controller |
| x000B0000 - x000BFFFF | Intel(R) 82852/82855 GM/GME Graphics Controller |
| x000C0000 - x000CC7FF | Intel(R) 82852/82855 GM/GME Graphics Controller |
| x000CC800 - x000CFFFF | System board extension for ACPI BIOS |
| x000E0000 - x000EFFFF | System board extension for ACPI BIOS |
| x000F0000 - x000F7FFF | System board extension for ACPI BIOS |
| x000F8000 - x000FBFFF | System board extension for ACPI BIOS |
| x000FC000 - x000FFFFF | System board extension for ACPI BIOS |
| x00100000 - x1DFEFFFF | System board extension for ACPI BIOS |
| x1DFF0000 - x1DFFFFFF | System board extension for ACPI BIOS |
| xD0000000 - xD7FFFFFF | Intel(R) 82852/82855 GM/GME Graphics Controller |
| xD8000000 - xDFFFFFFF | Intel(R) 82852/82855 GM/GME Graphics Controller |
| xE0000000 - xE0000FFF | Ricoh RL5C475 CardBus Controller |
| xE0000000 - xE1FFFFFF | Intel(R) 82801DB PCI Bridge - 244E |
| xE1000000 - xE101FFFF | Intel(R) PRO/1000 MT Network Connection |
| xE1020000 - xE102FFFF | Intel(R) PRO/1000 MT Network Connection |
| xE2000000 - xE207FFFF | Intel(R) 82852/82855 GM/GME Graphics Controller |
| xE2080000 - xE20FFFFF | Intel(R) 82852/82855 GM/GME Graphics Controller |
| xE2100000 - xE21003FF | Intel USB 2.0 Enhanced Host Controller |
| xE2101000 - xE21011FF | Realtek AC'97 Audio |
| xE2102000 - xE21020FF | Realtek AC'97 Audio |
| xFEC00000 - xFECFFFFF | System board extension for ACPI BIOS |
| xFEE00000 - xFEEFFFFF | System board extension for ACPI BIOS |
| xFFB00000 - xFFB7FFFF | System board extension for ACPI BIOS |
| xFFB80000 - xFFBFFFFF | Intel(r) 82802 Firmware Hub Device |
| xFFF00000 - xFFFFFFFF | System board extension for ACPI BIOS |

# C.3 <System IRQ and DMA Resource>

## C3.1 IRQ

| IRQ Number | Device |
|---|---|
| 0 | System Clock |
| 1 | Standard 101/102-Key or Microsoft Natural Keyboard |
| 2 | Programmable Interrupt Controller |
| 3 | Communication Port (COM2) |
| 4 | Communication Port (COM1) |
| 5 | Realtek AC'97 Audio |
| 5 | Intel(R) 82801DB/DBM SMBus Controller - 24C3 |
| 5 | ACPI IRQ Holder for PCI IRQ Steering |
| 6 | Standard Floppy Controller |
| 7 | Printer Port (LPT1) |
| 8 | System CMOS/ Real Time Clock |
| 9 | Ricoh RL5C475 CardBus Controller |
| 9 | ACPI IRQ Holder for PCI IRQ Steering |
| 9 | SCI IRQ used by ACPI bus |
| 10 | Intel(R) 82801DB/DBM USB Universal Host Controller - 24C7 |
| 10 | Intel(R) 82801DB/DBM USB Universal Host Controller - 24C2 |
| 10 | Intel(R) 82852/82855 GM/GME Graphics Controller |
| 10 | ACPI IRQ Holder for PCI IRQ Steering |
| 10 | ACPI IRQ Holder for PCI IRQ Steering |
| 11 | Intel(R) PRO/1000 MT Network Connection |
| 11 | Intel USB 2.0 Enhanced Host Controller |
| 11 | Intel(R) 82801DB/DBM USB Universal Host Controller - 24C4 |
| 11 | ACPI IRQ Holder for PCI IRQ Steering |
| 11 | ACPI IRQ Holder for PCI IRQ Steering |
| 12 | PS/2 Compatible Mouse Port |
| 13 | Numeric Data Processor |
| 14 | Primary IDE controller (dual fifo) |
| 14 | Intel(R) 82801DB Ultra ATA Storage Controller - 24CB |
| 15 | Secondary IDE controller (dual fifo) |
| 15 | Intel(R) 82801DB Ultra ATA Storage Controller - 24CB |

### C3.2 DMA

| Channel | Device |
|---|---|
| 0 | (free) |
| 1 | (free) |
| 2 | Standard Floppy Disk Controller |
| 3 | (free) |
| 4 | Direct Memory Access Controller |
| 5 | (free) |
| 6 | (free) |
| 7 | (free) |

# Contact Information

Any advice or comment about our products and service, or anything we can help you please don't hesitate to contact with us. We will do our best to support you for your products, projects and business


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